

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

WASTE TREATMENT

(No.)

CODE 629

DEFINITION

The mechanical, chemical or biological treatment of agricultural waste.

PURPOSE

To use mechanical, chemical, or biological treatment facilities and/processes as part of an agricultural waste management system:

- to improve ground and surface water quality by reducing the nutrient content, organic strength, and/or pathogen levels of agricultural waste
- to improve air quality by reducing odors and gaseous emissions
- to produce value added byproducts
- to facilitate desirable waste handling, storage, or land application alternatives

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where the characteristics of agricultural waste make the waste difficult to prevent from becoming a nuisance or hazard or where changing the characteristics provide additional utilization alternatives, and where conventional waste management alternatives are deemed ineffective. More specifically:

- Liquids and solids need to be separated for further processing or for effective transport and subsequent utilization.
- Raw agricultural waste contains excess nutrients for land application based on crop utilization requirements or nutrient ratios need to be modified to be more consistent with crop utilization requirements.
- There is a need to reduce the potential for leaching or runoff of nutrients.

- Odors and/or gaseous emissions from livestock production facilities and waste storage/treatment system components must be reduced.
- Value-added byproducts can be produced to offset treatment costs.
- Reduction of pathogens is required.

CRITERIA

General Criteria Applicable to All Waste Treatment Purposes.

Laws and Regulations. The installation and operation of waste treatment facilities shall comply with all federal, state, and local laws, rules, and regulations. The Alabama Department of Environmental Management (ADEM) Rules require owners/operators of animal feeding operations (AFO's) and associated waste management systems to fully implement and regularly maintain effective best management practices (BMP's) that meet or exceed NRCS technical standards and guidelines to prevent discharges and to ensure ground water and surface water quality.

All construction activities must implement adequate construction stormwater management BMP's. In addition, to comply with the National Pollutant Discharge Elimination System (NPDES) Rules, all construction activities involving one acre or more of land disturbance shall obtain NPDES permit coverage and have and follow a construction best management practices plan (CBMPP) until construction is complete and all disturbed areas are stabilized.

ADEM AFO/CAFO rules require that operators retain records documenting that (1) all designs and plans for any structures were prepared and certified by a professional engineer registered in the State of Alabama (PE); (2) construction was supervised by a PE; (3) once construction was completed, a PE

certified that the completed facility was constructed in accordance with the approved plans and met or exceeded good engineering practices and NRCS technical standards and guidelines; and (4) any modifications or repairs made to the structures were supervised and certified by a PE.

Cultural Resources. Ground disturbing activities such as excavation and site preparation for waste treatment facilities and pipelines have the potential to affect significant cultural resources. Complete a cultural resources review prior to ground disturbing activities to assure that existing cultural resources will not be adversely impacted.

Location. Locate the waste treatment facility as near the source of manure or other waste as practicable and as far from neighboring dwellings or public areas as possible.

Locate the facility to meet the minimum buffer distance requirements from water(s), wells, property lines, and public or private facilities as defined in the ADEM Administrative Code, Chapter 335-6-7, as amended.

Design. The system provider shall complete and supply to the landowner/operator a detailed design of the facility/process clearly outlining the objectives and anticipated outcomes of implementation.

The design documentation shall include a process diagram containing, as a minimum, the following information:

- volumetric flow rates including influent, effluent, and recycle streams
- waste load projections including volume, mass, and characteristics of the waste important to the waste treatment facility or process
- unit process volumes and hydraulic retention times where appropriate
- air emissions projections from the system
- nutrient fate projections within the system
- process monitoring and control system requirements as described below in the Monitoring section of the criteria

Provide independent, verifiable data demonstrating results of the use of the facility or process in other similar situations and locations.

Where use of a waste treatment facility or process to improve one resource concern negatively affects another, impacts and mitigation measures are to be documented if required by state or local agencies.

The mitigation measures shall become a required component of this practice.

Components. Waste treatment facilities and processes may consist of multiple components. Where criteria for individual components are described in existing NRCS conservation practice standards, use those practice standards and their specific criteria for planning, design, and installation of that component.

Where components of a facility or process are not described in a current NRCS conservation practice standard, the system provider shall furnish a one year warranty on all construction or applied processes. In addition, the manufacturer shall provide a warranty that describes the service life of each component and what the warranty covers.

The waste treatment facility or process shall have a minimum practice life of ten years. Where components have less than a ten year service life, their planned replacement during the life of the practice shall be clearly identified in the operation and maintenance (O&M) plan.

Expected System Performance. Clearly document the expected system performance prior to system installation. As a minimum, document the following:

- expected system volumetric flow rate
- expected macro-nutrient reductions or change in form
- expected pathogen reductions
- gaseous ammonia and hydrogen sulfide emissions reductions (or increases)

Operating Costs. Where components of a facility or process are not described in a current NRCS conservation practice standard, the system provider shall furnish an annual estimate of operating costs for the system. Clearly identify operating costs not based on actual systems data as estimates.

Monitoring. Install equipment needed to properly monitor and control the waste treatment facility or process as part of the system. Process control parameters to be monitored shall include those parameters identified in the design documentation. Identify parameters considered critical to proper system operation in the O&M plan. Monitor the run status of critical equipment and unit processes.

Byproducts. Implementation of a waste treatment process or operation of a waste treatment facility

shall not result in discharge of byproducts harmful to the environment.

Handle and store all byproducts in such a manner as to prevent nuisances to neighbors or to the public at large.

Byproducts land applied to supply plant nutrients shall meet the criteria in Alabama NRCS conservation practice standards Waste Utilization, Code 633; and Nutrient Management, Code 590.

Handle and dispose of any unmarketable or unused byproducts in accordance with all applicable federal, state, and local laws and regulations. Prepare a plan meeting NRCS standards for dealing with such byproducts prior to utilization of the process or installation of the waste treatment facility, and include a listing of any permits or permissions required for the execution of the plan.

Recycle byproducts to the extent possible without causing a hazard to the environment.

Safety. Design the process or facility to include safety features to minimize hazards. Provide guards and shields for moving parts of the equipment used in the treatment process. Fence waste treatment facilities and post warning signs where needed to prevent children and others from entering a hazardous area.

Conduct all treatment processes in accordance with all safety regulations. Utilize protective clothing when handling potentially harmful chemicals that may be used in the process. Provide proper ventilation.

CONSIDERATIONS

In determining the location of the facility, consider elevation and distance from various components to take advantage of gravity flow where possible. Proper location should also consider slope, transfer distance of manure and other waste, vehicle access, wind direction, proximity of streams and flood plains, and visibility.

Waste treatment may require specific total solids and nutrient contents of the waste stream. Consider pretreatment options, such as dilution or settling, to adjust the solids content before entering the waste treatment facility or process.

Evaluate the visual impact of the waste treatment facility or process within the overall landscape context. Consider screening with vegetative

plantings, landforms, or other measures to alleviate a negative impact or enhance the view.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for waste treatment facilities in accordance with the criteria of this standard and good engineering practice. Include engineering drawings and supporting documentation as well as other plans required to manage the system (e.g., a nutrient management plan for proper land application of byproducts).

As a minimum, the plans and specifications shall provide the following:

- layout and installation details of livestock facilities, waste collection points, waste transfer components, and waste treatment and storage facilities
- location of all inflow and discharge pipelines, pipeline materials, diameter, and slope
- details of support systems for all components of the treatment facility
- fencing and signage as appropriate for safety purposes

OPERATION AND MAINTENANCE

Develop and review an O&M plan with the owner/operator prior to construction of a waste treatment facility or implementation of a waste treatment process. Provide an O&M plan consistent with the proper operation of all system components, containing requirements including but not limited to:

- recommended loading rates of the waste treatment facility or process for hydraulic and critical pollutant parameters
- proper operating procedures for the waste treatment facility or process, including the amount and timing of any chemicals added
- O&M manuals for pumps, blowers, instrumentation and control devices, and other equipment used as components of the waste treatment facility or process
- description of the planned startup procedures, normal operation, safety issues, and normal maintenance items
- procedures for the planned replacement of components with less than a ten year service life
- alternative operating procedures in the event of equipment failure

- troubleshooting guide
- monitoring and reporting plan designed to demonstrate system performance on an ongoing basis

REFERENCES

ADEM Administrative Code

AFO/CAFO Rule, Chapter 335-6-7, as amended
Construction Stormwater Rule, Chapter 335-6-12, as amended

ADEM/NRCS Buffer Distance Summary for Animal Feeding Operations

NRCS Cultural Resources Handbook

NRCS, National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook. 1992, last revised June 1999